

$$47. a.) y = \frac{1}{\sqrt{x}} \quad x = \frac{1}{4} \quad y = 1 \quad \pi \left(\left(\frac{1}{y^2} \right)^2 - \left(\frac{1}{4} \right)^2 \right)$$

$$x = \frac{1}{y^2}$$

$$\pi \int_1^2 \frac{1}{y^4} = \frac{1}{16} dy = \left(\frac{11\pi}{48} \right)$$

$$b.) y = \frac{1}{\sqrt{x}} \quad x = \frac{1}{4} \quad y = 1 \quad 2\pi \left(\frac{1}{\sqrt{x}} \right) dx$$

$$2\pi \int_{\frac{1}{4}}^1 x \left(\frac{1}{\sqrt{x}} - 1 \right) dx = \left(\frac{11\pi}{48} \right)$$

$$48) f(x) = \begin{cases} \frac{\sin x}{x}, & 0 < x \leq \pi \\ 1, & x = 0 \end{cases}$$

$$xf(x) = \begin{cases} \sin x, & 0 < x \leq \pi \\ x, & x = 0 \end{cases} \quad \lim_{x \rightarrow 0} xf(x) = 0$$

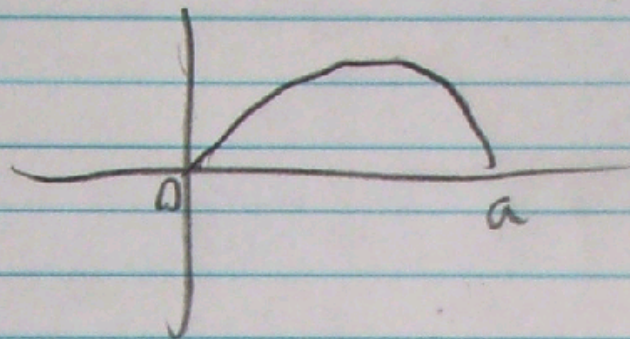
$$(b) V = 2\pi \int_0^\pi x f(x) dx$$

$$V = 2\pi \int_0^\pi \sin x dx$$

$$V = 2\pi [-\cos x]_0^\pi = 2(-1 + 1) = \boxed{4\pi}$$

53.

$$ax - x^2$$



$$\pi R^2$$

$$\pi \int_0^a (ax - x^2) dx$$

$$\pi \int_0^a ax^2 - 2ax^3 + x^4$$

$$\pi \left[\frac{a^2 x^3}{3} - \frac{ax^4}{2} + \frac{x^5}{5} \right]_0^a$$

$$\cancel{V} \times \text{axis} \rightarrow \frac{\pi a^5}{30}$$

53 cont. $V(y)$ axis

$$2\pi \int r h$$

$$\int_0^a 2\pi x (ax - x^2) dx$$

$$2\pi \int_0^a ax^2 - x^3$$

$$2\pi \left[\frac{ax^3}{3} - \frac{x^4}{4} \right]_0^a$$

$$\frac{2\pi a^4}{12} = \frac{\pi a^4}{6}$$

$$\frac{\pi a^4}{6} = \pi \frac{a^5}{30}$$

$$\frac{a^4}{6} = \frac{a^5}{30}$$

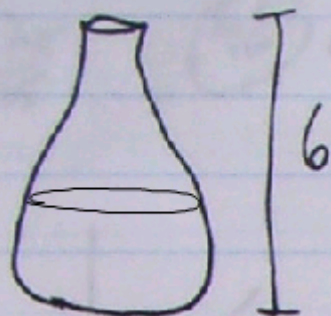
$$30 a^4 = 6 a^5$$

$$5 a^4 = a^5 \quad 5 \neq a$$

7.3

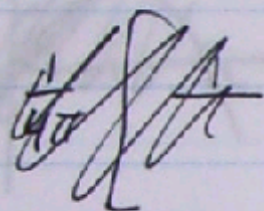
if $C(y)$ = circums. as funct. of y

4/15/10



Areas are ~~area~~ $\left(\frac{C(y)}{2\pi}\right)^2 \pi$ $\left(\frac{L_1}{2\pi}\right)^2 \cdot \pi$

$$\text{vol} \int_0^6 \pi \left(\frac{C(y)}{2\pi}\right)^2 dy \rightarrow \frac{1}{4\pi} \int_0^6 C(y)^2 dy$$



$$\text{Trap } \frac{h}{2} (y_0 + 2y_1 + 2y_2 + \dots + 2y_{n-1} + y_n)$$

$$\text{Simp } \frac{h}{3} (y_0 + 4y_1 + 2y_2 + 4y_3 + \dots + 2y_{n-2} + 4y_{n-1} + y_n)$$

$$h = \frac{b-a}{n}$$

$$h = \frac{6-0}{12}$$

$$\frac{h}{2} = \frac{6}{24} = \frac{1}{4}$$

$$\frac{1}{4\pi} \left[\frac{1}{4} (5 \cdot 4^2 + 2(4.5^2 + 4.4^2 + \dots + 9.0^2) + 6 \cdot 3^2) \right] \approx 34.709$$